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(54) **A seal consisting of microporous polytetrafluoroethylene and a procedure for its manufacture**

(57) A seal consisting of extruded and stretched microporous polytetraethylene, in which the height of the stretched sealing profile is greater than its maximum width. This seal makes it possible to compensate for large depressions on flange surfaces which are to be sealed, and at the same time enables a large savings in material. In addition, only small flange forces are necessary for a predetermined leakage pressure. For more convenient operation during the incorporation of the seal, the stretched sealing profile is rough-pressed in such a way that its height is smaller than its width.

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Description

A seal consisting of microporous polytetrafluoroethylene and a procedure for its manufacture

The present invention relates to a seal consisting of extruded and stretched, preferably rough-pressed microporous polytetrafluoroethylene and a procedure for manufacturing such a seal, in which the starting material is first extruded and then stretched.

Known in the art are extruded and stretched sealing profiles with a circular cross section, which are flat-pressed during rough pressing. The outlay of material for this seal to compensate for given depressions on flange surfaces is relatively high. In addition, high flange forces which require strong, and therefore uneconomical flanges are necessary for maintaining a specific leakage pressure in these known seals due to the high s aling width in a built-in state.

The object of the present invention is to further develop the type of seal and procedure for its manufacture in question in such a way as to reduce the material outlay of the relatively expensive polytetrafluoroethylene material for the seals, with the objective of compensating for given depressions in the flange

surfaces and reducing the flange forces for achieving a specific leakage pressure of the seals.

The object is achieved according to the invention in a seal of the kind mentioned at the outset by virtue of the fact that the height of the stretched sealing profile is greater than its maximum width, with the height to maximum width ratio of the stretched sealing profile advantageously being greater than 1 and less than 10, in particular 2. The seal according to the invention can compensate for large depressions in the flange surfaces due to its large sealing height, while enabling a savings in material of roughly 35% in comparison to the known seals. In addition, the seal requires only low flange forces (20 to 40% reduction in flange forces in comparison with the known seals), and therefore more economical, thin flanges, for achieving a predetermined leakage pressure due to its low sealing width.

According to an advantageous embodiment of the present invention, the commercially available seal is rough-pressed in such a way that the height of the rough-pressed sealing profile is smaller than its width, with the height to width ratio of the rough-pressed sealing profile advantageously being greater than 0.4 and smaller than 1, in particular 0.8. This prevents the seal from tilting during incorporation and from shortening in the built-in state.

In order to accurately position the seal during incorporation, the rough-pressed sealing profile has an adhesive tape covered with a strippable paper strip or the like on the small face of the stretched sealing profile.

The stretched sealing profile advantageously has a specific density ranging from 0.15 to 1 g/cm^3, in particular 0.25 g/cm^3, and the rough-pressed sealing profile has a specific density ranging from 0.5 to 1.5 g/cm^3, in particular 0.6 g/cm^3. The low density of the stretched sealing profile presupposes a high level of stretching of the seal, which results in a distinct fiber structure in the longitudinal direction. This distinct fiber structure prevents the seal from flowing excessively in the transverse direction in a built-in state, as a result of which the flange forces may be kept low for achieving a specific leakage pressure of the seal.

According to the invention, the most varied of profiles may be used as the extruded and stretched sealing profiles, e.g. a rectangle, an ellipse, a lozenge, a trapezoid or the shape of a convex lens.

The new seal is manufactured according to the invention by first extruding and then stretching the starting material, during which the starting material is extruded and stretched into a sealing profile whose height is greater than its maximum width. Stretching takes place according to a procedure such as the one known from DE-AS 21 23 316. Advantageous embodiments of the procedure according to the invention are described in additional subclaims.

The advantages to the seal according to the invention may also be realized by connecting two flat or square stretched sealing surfaces with each other in such a way that the height of the combined sealing profile is greater than its maximum width.

The advantages to the seal according to the invention may also be realized to a certain extent by subjecting the known extruded and stretched seal with a circular or other cross section to flat rough-pressing, and then cutting it at the edges.

Additional advantages, features and possible applications of the present invention are given in the following description of embodiments in connection with the drawing. Shown on

Figure 1a, 1b and 1c is a sealing profile according to the present invention in a stretched, rough-pressed and completely pressed built-in state,

Figure 2a, 2b, 2c, 2d, 2e and 2f are various sealing profiles in a stretched state according to the present invention, and on

Figure 3 is a diagram of leakage pressure as a function of the flange force for the known round seal and for the seal according to the invention.

Figure 1a shows a rectangular sealing profile 1 in a stretched state, whose height is double its width, and whose specific density measures, for example, 0.25 g/cm^3. Figure 1b shows the sealing profile 1′ in a rough-pressed, commercially available state, with the height to width ratio measuring 0.8, and the specific density measuring 0.6 g/cm^3. In this case, the width of the rough-pressed sealing profile 1′ has remained the same, and the height has been reduced by 60% in comparison to the only stretched sealing profile. An adhesive tape 2 covered with a paper strip is arranged on the lower side of the rough-pressed sealing profile 1′. In Figure 1c, the sealing profile 1′′ is

shown in a completely pressed state, with the sealing profile being fully compressed essentially over its entire surface (double-hatched area) to a specific density ranging from 1.8 to 2.2 g/cm^3.

Figure 2 shows various sealing profiles in a stretched state, whose respective height is greater than their maximum width.

Figure 3 shows the leakage pressure as a function of flange force for a known round seal (curve A) and for the new seal (curve B). A comparison of these curves shows that the flange force necessary for a specific leakage pressure in the case of the new seal could be reduced considerably in comparison with the known seal, e.g. by about 80 KN at a leakage pressure of 35 bar.

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C l a i m s

1. A seal consisting of extruded and stretched microporous polytetrafluoroethylene, characterized by the fact that the height of the stretched sealing profile (1) is greater than its maximum width.

2. A seal according to Claim 1, characterized by the fact that the height to maximum width ratio of the stretched sealing profile (1) is greater than 1 and less than 10, in particular 2.

3. A rough-pressed seal according to Claim 1 or 2, characterized by the fact that the height of the rough-pressed sealing profile (1') is less than its width.

4. A seal according to Claim 3, characterized by the fact that the height to width ratio of the rough-pressed sealing profile (1') is greater than 0.4 and less than 1, in particular 0.8.

5. A seal according to at least one of Claims 1 to 4, characterized by the fact that the rough-pressed sealing profile (1') has an adhesive tape (2) covered with a strippable paper strip or the like on the small face of the stretched sealing profile (1).

6. A seal according to at least one of Claims 1 to 5, characterized by the fact that the stretched sealing profile (1) has a specific density ranging from 0.15 to 1 g/cm^3, in particular 0.25 g/cm^3, and that the rough-pressed sealing profile (1') has a specific density ranging from 0.5 to 1.5 g/cm^3, in particular 0.6 g/cm^3.

7. A seal according to at least one of Claims 1 to 6, characterized by the fact that the stretched sealing profile has the shape of a rectangle, an ellipse, a lozenge, a trapezoid or a convex lens.

8. A procedure for manufacturing a seal consisting of polytetrafluoroethylene, in which the starting material is first extruded and then stretched, characterized by the fact that the starting material is extruded and stretched into a sealing profile whose height is greater than its maximum width.

9. A procedure according to Claim 8, characterized by the fact that the stretched profile is rough-pressed in a vertical direction, until the height of the rough-pressed sealing profile is less than its width.

10. A procedure according to Claim 9, characterized by the fact that the height of the stretched sealing profile is reduced by approx. 60% during rough-pressing.

11. A procedure according to Claim 9 or 10, characterized by the fact that the rough-pressed sealing profile is provided with an adhesive tape covered with a strippable paper strip on the small face of the stretched sealing profile.

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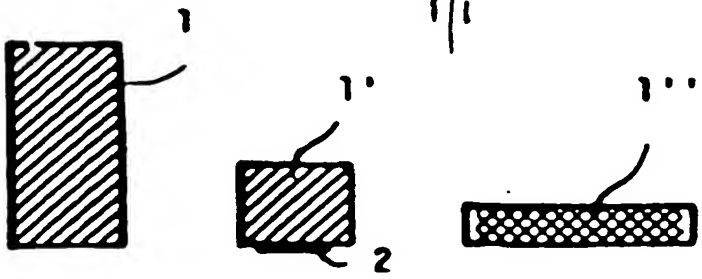

Fig. 1a Fig. 1b Fig. 1c

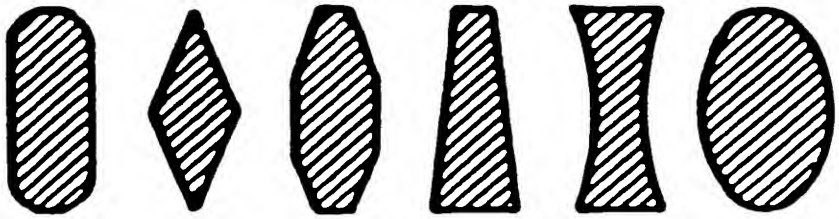

Fig. 2

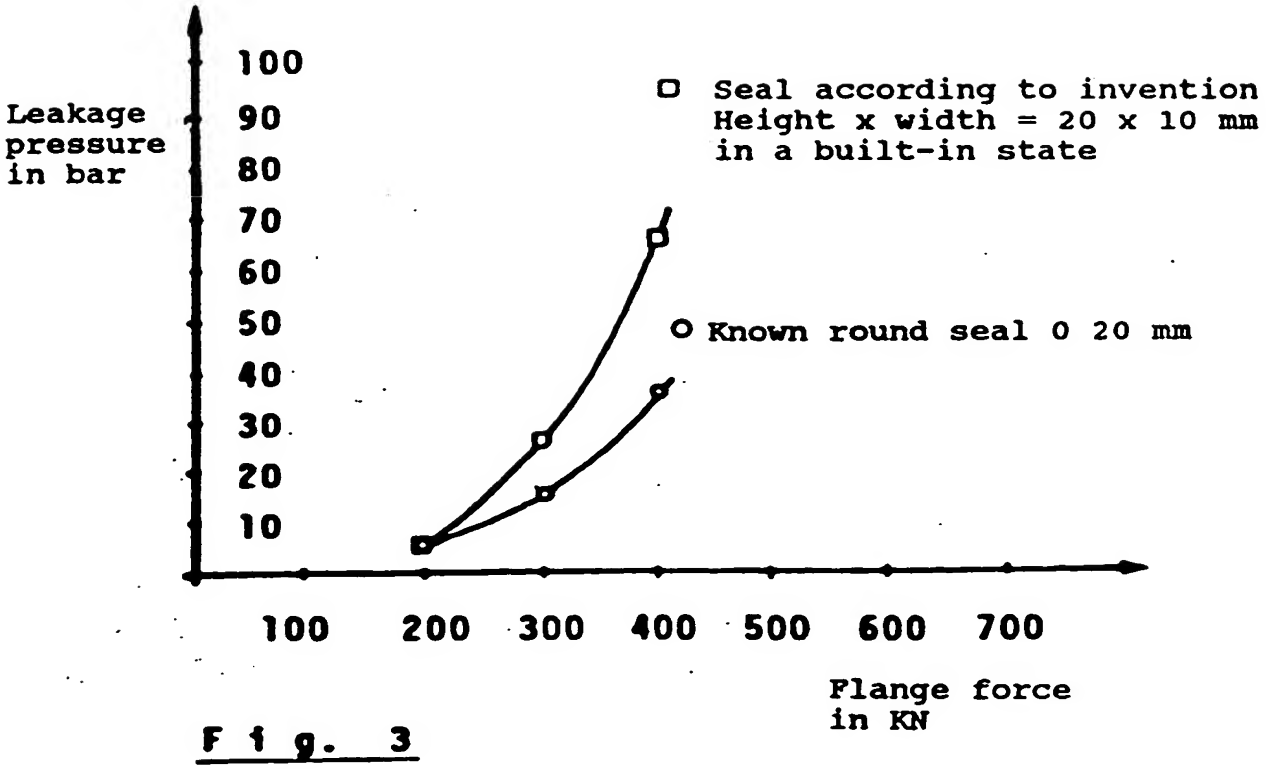

Fig. 3